

and vents on the inner side of the cup among the granulations. Wall almost entirely composed of short-jointed keratose fibre of a sponge-yellow colour, in which there is very little sand, and that chiefly towards the surface, while there is a great deal *outside* the fibre in the adjoining sarcode. Size of specimen 6 in. across the brim, 1 in. deep in the centre, $\frac{1}{4}$ in. through the wall in the centre, diminishing towards the circumference.

Hab. Marine.

Loc. Port Phillip Heads, South Australia. Depth?

Obs. The pores being in the dermal incrustation outside, while the vents are immediately opposite, in the dermal incrustation of the cup inside, causes the wall, when the incrustations on both sides are washed off, to present a sieve-like structure.

[To be continued.]

XIX.—*Diagnoses of new Species of Cephalopoda collected during the Cruise of H.M.S. 'Challenger.'*—Part I. *The Octopoda.* By WILLIAM E. HOYLE, M.A. (Oxon), M.R.C.S., F.R.S.E., Naturalist to the 'Challenger' Commission.

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OCTOPUS, Lamarck.

Octopus verrucosus, n. sp.

The *Body* is rounded, but so distorted by compression that no further details can be given. The *mantle-opening* extends fully halfway round the body, terminating a little below and behind the eye. The *siphon* is long, evenly conical, and pointed, and extends nearly halfway to the umbrella-margin.

The *Head* is short, not so broad as the body, and with *eyes* but slightly prominent.

The *Arms* are unequal in length, the second pair being considerably the longest, and almost six times as long as the body; they are comparatively stout and taper gradually. The *umbrella* extends about one fifth up the longest arms. The *suckers* are fairly close, deeply cupped and marked with radial grooves, between which are numerous very minute papillæ. About four suckers on each lateral arm opposite the umbrella-margin are larger than the others; beyond these they gradually diminish. The *hectocotylus* is present in both

specimens and is very minute (about 2 millim. long in the larger); it is acutely pointed, and the median groove has three transverse ridges.

The *Surface* of the back, dorsal surface of the head, and umbrella is covered with irregular closely set warts, which attain a maximum diameter of several millimetres in the nuchal region; the warts extend on to the ventral surface of the body, where they become much smaller, more even, and average less than 1 millim. in diameter. Above each eye there seems to have been a short cirrus, but these have been rather damaged.

The *Colour* is a dull purplish grey, very dark above, much lighter below.

Hab. Inaccessible Island, Tristan da Cunha. Two specimens, ♂.

Octopus Boscii (Lesueur), var. *pallida*, nov.

The *Body* is evenly rounded, with a slight depression in the median ventral line. The *mantle-opening* extends less than halfway round the body, terminating immediately below the eye, and further from it than from the base of the *siphon*, which is long and pointed, has rather a small opening, and extends two thirds the distance of the umbrella-margin.

The *Head* is short, and not so broad as the body; the *eyes* are only slightly prominent.

The *Arms* are subequal, nearly four times the length of the body, and taper evenly to fine points. The *umbrella* extends one third up the arms and is a little wider laterally than dorsally. The *suckers* are closely set, deeply cupped, and marked with regular radial grooves; their biserial arrangement commences immediately after the first. One arm bears a supernumerary sucker in the largest specimen. The *circumoral lip* is low and narrow.

The *Surface* is covered with warts, which are largest and most numerous on the dorsal surface of the body, head, and umbrella, and dorsal aspects of the arms, where they have a quadrifid or quinquefid form, usually with a small wartlet in the centre, each forming a figure like a star or rosette. Towards the ventral surface and on the sides of the arms the warts are simple and much smaller. On the back are about ten long cirri, which are rough with small warts, and above each eye is a very large arborescent cirrus with six or seven smaller ones beside it.

The *Colour* is a pale purplish grey, shading off to a creamy white on the ventral surface.

Hab. Off East Moneœur Island, Bass Strait, 38 fathoms (Station 162). One specimen, ♀.

Off Twofold Bay, Australia, 150 fathoms (Station 163 A).
Two specimens, 1 ♀, 1 juv.

Octopus australis, n. sp.

The *Body* is rounded, and wider behind than in front; depressed, and with a well-marked ventral median groove. The *mantle-opening* extends nearly halfway round the body. The *siphon* is of medium size, at first the lateral margins are parallel and then taper rapidly to a blunt point; it extends less than halfway to the umbrella-margin.

The *Head* is narrower than the body, and the *eyes* somewhat prominent, dorsally rather than laterally.

The *Arms* are unequal, the lateral being slightly the longest, and about three times as long as the body; they are slender and tapering. The *umbrella* is longer than the length of the body, larger ventrally than dorsally, and largest of all laterally. The *suckers* are prominent and closely set; they are altogether larger on the lateral arms, and extend in a double row to the centre; the radial grooves are deep and extend quite to the margin. The *hectocotylus* is absent.

The *Surface* of the back of the body, head, and dorsal aspects of the umbrella and arms is covered with thick-set hemispherical pimples, which are also found on the inner side of the membrane between the two dorsal arms, and on the inner surface of the arms between the suckers; they are smaller and more sparse on the ventral surface of the body. A large rough cirrus and a few larger pimples are found over each eye. A raised ridge passes backwards from the base of the siphon along the ventro-lateral margin of the body, meeting its fellow of the opposite side at the posterior extremity*.

The *Colour* is deep purplish on the back, mottled on the sides, and cream below.

Hab. Port Jackson, Australia, 6-15 fathoms. Two specimens, 1 ♀, 1 juv.

Octopus hongkongensis, Steenstrup, MS.

The *Body* is rounded, with a median ventral furrow, and depressed (? from pressure). The *mantle-opening* is slightly less than half the circumference, and terminates midway between the siphon and the eye, and a little behind the latter. The *siphon* is comparatively short and conical, and extends one third the distance to the umbrella-margin.

The *Head* is comparatively broad, almost as broad as the body, and the *eyes* appear to have been prominent.

* I have considerable doubt whether this be really one of the specific characters; but as it occurs in both specimens, I have thought it well to mention it.

The *Arms* are unequal, the ventral considerably shorter than the dorsal and dorso-lateral, on an average six times as long as the body, stout and tapering very rapidly towards the ends. The *umbrella* reaches up one fifth of the length of the dorsal arms, and is a little wider between the lateral and a little narrower between the ventral arms. The *suckers* are not closely packed and not enlarged on the dorsal arms, notwithstanding the sex of the specimen. The *hectocotylized arm* is very short, but the modified extremity is long and narrow, with parallel sides tapering only at the extremity to a blunt point; a narrow fillet runs between the two marginal ridges.

The *Surface* of the body is sprinkled dorsally with minute hemispherical warts, which become smaller and gradually disappear on the sides and lower surface; they are also found on the dorsal surface of the head and of the umbrella. Above each pupil stands a small cirrus, immediately behind which is a larger one.

The *Colour* is a dull red on the dorsal surface, lighter and brighter below, sprinkled with dull reddish-brown dots.

Hab. The *Hyalonema*-ground south of Japan, 345 fathoms (Station 232). One specimen, ♂.

Octopus tonganus, n. sp.

The *Body* is rounded, depressed, and broader than long, with a marked but shallow median groove on the ventral surface. The *mantle-opening* extends about one third round the circumference of the body, terminating nearer to the funnel than to the eye. The *siphon* is short and conical, and extends rather more than halfway to the umbrella-margin.

The *Head* is small and the *eyes* prominent.

The *Arms* are unequal, the order being 3, 2, 4, 1; on an average they are nearly ten times as long as the body, and taper gradually to very fine points. The *umbrella* is very small and slightly narrower dorsally than laterally. The *suckers* are for the most part small and closely packed, the first four are arranged in a single row; in the male there are four large ones on each lateral arm opposite the margin of the umbrella, beyond which they gradually diminish. The *hectocotylus* is very minute.

The *Surface* is in general smooth; the back bears a few small papillæ, but owing to the compression of the specimens it is impossible to make out their exact number. There are three minute cirri over each eye.

The *Colour* is on the whole grey, paler below; this is due to dark specks sprinkled more or less closely over a cream-

coloured ground. One specimen has a purplish patch at either side of the mantle-opening.

Hab. The Reefs, Tongatabu. Three mutilated specimens, 1 ♂, 2 ♀.

Octopus vitiensis, n. sp.

The *Body* is nearly oblong, but becomes somewhat narrower posteriorly. The *mantle-opening* extends nearly one third round the body, and terminates some distance below and behind the eye. The *siphon* is long and acutely pointed, and extends about halfway to the umbrella-margin.

The *Head* is broader than the body, with large laterally prominent *eyes*.

The *Arms* are subequal, the two lateral pairs being a little longer than the others; on an average they are nearly three times as long as the body, and taper rather rapidly about the middle of their length and then evenly to fine points. The *umbrella* extends nearly one third up the arms, least along the dorsal pair. The *suckers* are sunken, comparatively large, with a dark margin and very well-marked radial grooves. The first two on each arm are in a single row, owing to the compression of the arms laterally; there are no enlarged suckers on the lateral arms. The *hectocotylus* is not developed.

The *Surface* of the dorsum of the body bears a few minute warts scattered here and there; over each eye there is a rather large branched cirrus, with a few small ones scattered round it. The internal surfaces of the arms are covered with minute hemispherical warts, so as to resemble shagreen.

The *Colour* is very dark grey, almost black on the dorsal surface and outside the arms; paler grey below and on the inner surfaces of the arms. The dark covering of the body is not continued over the inner surface of the membrane covering the two dorsal arms.

Hab. The Reefs, Kandavu, Fiji. One specimen, ♀.

Octopus duplex, n. sp.

The *Body* is short and evenly rounded, with the merest trace of a median ventral groove. The *mantle-opening* extends about half round the circumference, and terminates halfway between the siphon and the eye. The *siphon* is relatively long, conical and pointed, and extends about halfway to the umbrella-margin.

The *Head* is small and the *eyes* rather prominent.

The *Arms* seem to have been unequal, the lateral a little the longest, but so many have been mutilated that it is difficult to be certain; they are about four times the length of the

body. The *umbrella* extends about one third up the arms, furthest between the lateral pairs. The *suckers* are large, close, and prominent, with a narrow margin marked off from the basal portion; the radial grooves extend to the margin and form notches in it. The *hectocotylus* is not present; the third right arm has been mutilated, but the stump shows no groove running up the outer ventral margin.

The *Surface* is smooth; an interrupted ridge starting from the base of the siphon passes backwards along the ventro-lateral margin of the body, probably due to contraction. There are three small papillæ above each eye.

The *Colour* is a pale bluish grey above, shading into cream below.

Hab. Off Twofold Bay, Australia, 150 fathoms (Station 163 A). Two specimens, 1 ♀, 1 juv.

Octopus bandensis, n. sp.

The *Body* is rounded and depressed (? from pressure), and with a slight ventral groove. The *mantle-opening* terminates immediately below and behind the eye. The *siphon* extends as far as the umbrella-margin, and is acutely pointed.

The *Head* is broader than the body and flattened by compression; the *eyes* are very prominent.

The *Arms* are unequal, the third pair being much the longest and stoutest; on the average they are four times as long as the body; they taper gradually at first and then more rapidly. The *umbrella* is very small. The *suckers* are prominent, the first form being disposed in a single row, and none are enlarged on the lateral arms. The *hectocotylus* is not developed.

The *Surface* is smooth in general, but there are about twelve warts on the back and sides of the body and a large cirrus over each eye, with several small ones near it.

The *Colour* is deep black, apparently owing to treatment with osmic acid.

Hab. Banda. One specimen, juv.

Octopus marmoratus, n. sp.

The *Body* is round, not depressed, and a little longer than wide. The *mantle-opening* extends somewhat less than half-way round the body, terminating nearer to the siphon than to the eye and considerably behind the latter. The *siphon* is small and acutely conical, and extends about one third the distance to the umbrella-margin.

The *Head* is narrow and the *eyes* are prominent where they have not suffered from compression.

The *Arms* are subequal, eight times as long as the body ; they are very long and slender, the last property being more marked in the females than in the male ; they taper more rapidly at first than near the extremities, which are much attenuated. The *umbrella* is very wide, especially in the male, where it extends almost one third up the arms ; in the females its extent is only one sixth. The *suckers* are rather large and closely set ; in the male a few suckers opposite the umbrella-margin are slightly, but not markedly, larger than the others. The *hectocotylus* is small and has about ten small transverse ridges.

The *Surface* appears to have been smooth, except for a few short ridges placed longitudinally on the back and sides ; but the skin is shrivelled by the action of the spirit, so that it is difficult to be certain. A conical cirrus is situated above and slightly behind each eye ; but in some cases this has been destroyed.

The *Colour* is a stone-grey, with dark pigment disposed in veins like those of marble on the dorsal surface of the body, head, and umbrella ; the male is much darker, so that the marbling is almost concealed. Traces of an oval spot are seen in front of and below the eye on both sides of one female specimen and on one side of the other ; but this spot is concealed by the dark colouring in the male, even if it exist.

Hab. On the reefs, Honolulu, Sandwich Islands. Three specimens, 1 ♂, 2 ♀.

Octopus bermudensis, n. sp.

The *Body* is spheroidal, acuminate behind, and with a median groove ventrally. The *mantle-opening* extends rather less than half round the circumference of the body, and terminates some distance behind and a little below the eye. The *siphon* is long and smooth, and attached by nearly all its length to the head ; it extends fully halfway to the umbrella-margin.

The *Head* is much narrower and more depressed than the body ; the *eyes* are scarcely at all prominent.

The *Arms* are unequal, in the order 1, 2, 3, 4, about six times as long as the body ; they are very long and slender, tapering but slightly. The *umbrella* is small. The *suckers* are small, prominent, and closely set, and the first four stand in a slightly zigzag line. The *hectocotylus* is absent.

The *Surface* is smooth for the most part, but the skin is wrinkled over the posterior acuminate extremity, owing to the action of the spirit ; there is one very small wart over each eye.

The *Colour* is yellow-ochre, with two pale sienna patches on the back and on the head.

Hab. Bermuda. One specimen, ♀ juv.

Octopus levis, n. sp.

The *Body* is oblong, depressed, and bulges a little at the sides; the *mantle-opening* extends about one third round the circumference, terminating about midway between the siphon and the eye. The *siphon* is short and small, extending scarcely one third the distance to the umbrella-margin.

The *Head* is almost as broad as the body, and the *eyes* are large, spheroidal, and prominent, with very small circular apertures.

The *Arms* are subequal and short compared with the body, being about three times its length; they taper gradually to moderately fine points. The *umbrella* is large, extending about one third up the arms. The *suckers* are small and prominent and arranged in two rows from the commencement; a narrow well-marked groove runs across the arm between each two suckers (possibly due to contraction). The *hectocotylus* is well developed, short, and tapering rapidly to a blunt point; the median groove has about ten transverse bars. The *circumoral lip* is unusually thick.

The *Surface* appears to have been perfectly smooth, but is now covered with wrinkles, due to the action of the spirit.

The *Colour* is a dull grey, inclining to stone-colour below.

Hab. Off Heard Island, Southern Ocean, 75 fathoms (Station 151). Four specimens, 1 ♂, 1 ♂ juv., 2 ♀ juv.

Octopus januarii, Steenstrup, MS.

The *Body* is rounded, widening a little posteriorly; the ventral groove is very faint. The *mantle-opening* terminates just below the eyes. The *siphon* is bluntly conical and extensively attached to the umbrella; it extends less than half-way to the umbrella-margin.

The *Head* is small and the sides are entirely occupied by the enormous *eyes*, which are swollen and globular, but with very small palpebral openings. The skin covering them is so thin that the dark pigment within is distinctly visible.

The *Arms* are unequal, the dorsal pair being the largest; on an average they are four times as long as the body. The *umbrella* is about equally wide all round, except that it is a little shorter between the two ventral arms. The *suckers* are comparatively small, prominent, and separate; more widely in one specimen than in the other, probably owing to

its being less contracted by spirit. None of the suckers on the lateral arms are enlarged, notwithstanding the sex. The *hectocotylus* is well developed; it is broad, and tapers rapidly to an acute point; in one specimen about seven transverse ridges can be counted in the proximal half of the median groove; in the distal half and in the other specimen they are indistinct.

The *Surface* is perfectly smooth all over.

The *Colour* is a pale purplish pink, deeper above than below.

Hab. Off Barra Grande (Station 122), one specimen, ♂; (Station 237), one specimen, ♂.

ELEDONE, Leach.

Eledone rotunda, n. sp.

The *Body* is spheroidal, very little longer than broad, and the ventral groove is not marked. The *mantle-opening* extends one third round the body, ending some distance directly below the eyes. The *siphon* is slightly tapering, and extends one third the distance to the umbrella-margin.

The *Head* is short, nearly as broad as the body, and the *eyes* are round and rather prominent.

The *Arms* are equal and about twice as long as the body; they are very stout, and taper gradually to blunt points; their section shows a triangle projecting inwards and a rounded surface looking outwards, the former much more prominent than the latter. The *umbrella* is wide, extending one third up the arms, a little further dorsally than ventrally. The *suckers* are comparatively small, closely set, and deeply cupped. There is no trace of a *hectocotylus*.

The *Surface* is perfectly smooth.

The *Colour* is dull purple, palest on the body and deepest on the inner surface of the umbrella.

Hab. The Southern Ocean, 1950 fathoms (Station 157); one specimen, sex? South Pacific, 2225 fathoms (Station 298); one specimen, arms only, sex?

Eledone brevis, n. sp.

The *Body* is short, rounded, and depressed; blunt behind and deeply grooved below. The *mantle-opening* extends one third round the animal and terminates immediately below the eyes. The *siphon* is short, acutely pointed, and extends less than halfway to the umbrella-margin.

The *Head* is very short and nearly as broad as the body. The *eyes* are spheroidal and very prominent.

The *Arms* are equal and about half as long again as the body; they are short, stout, and taper gradually to blunt points. The *umbrella* extends halfway up the arms, rather more in the largest specimen. The *suckers* are round, prominent, and deeply cupped, and there are about 30 on each arm. The *hectocotylus* is not developed.

The *Surface* is smooth, with the exception of three cirri arranged in a triangle over each eye. Behind the left eye in the largest specimen the skin is elevated into a number of small papillæ, and a few similar ones are seen on the back of the medium-sized specimen.

The *Colour* is a dull purplish grey above, inclining to pale ochre below.

Hab. South Atlantic, 600 fathoms (Station 320). Three specimens, ♀.

JAPETELLA *, n. gen.

The *Body* is gelatinous in consistency and semitransparent, and more or less oblong in form. The *mantle-opening* is very wide.

The *Arms* are unequal, the longest (the third pair) being only about equal in length to the body. The *umbrella* is small and the *suckers* arranged in a single row.

Japetella prismatica, n. sp.

The *Body* is of gelatinous consistency and semitransparent; it is somewhat longer than broad, flat on the dorsum, and with the median ventral region raised into a prominent ridge, which gives the body a prismatic form. The *mantle-opening* appears to have been wide and to have terminated behind the eyes; but as it has been torn away from the head dorsally, it is impossible to be certain of this. The *siphon* extends almost to the margin of the umbrella, and is but slightly conical, with a broad truncated extremity. There is *no median septum* in the branchial cavity.

The *Head* is about as broad as the body; the *eyes* are rounded and prominent laterally, the spherical lens protruding from the middle of each.

The *Arms* are unequal, the third being the longest, one quarter longer than the body and about one third longer than the fourth, which is slightly longer than the second, and this than the first, so that the order of length is 3, 4, 2, 1. The arms are stout and taper gradually to blunt points. The

* Named in honour of Professor Japetus Steenstrup.

umbrella extends about halfway up the dorsal arms and one fourth up the ventral arms, its extent being intermediate between these extremes in the case of the other arms. The *suckers* are round and prominent, and in many cases show a double margin, due to a thin membrane surrounding the thickened edge of the sucker; they commence one sucker's breadth from the oral margin, and become gradually larger and wider apart as far as the middle of the arm, where they are one sucker's breadth apart, after which they are smaller and closer, and towards the extremity stand in contact. There is no trace of a *hectocotylus*.

The *Surface* of the body appears to have been perfectly smooth; it is covered with torn remains of epithelium, but there are neither warts nor cirri.

The *Colour* is a pale yellowish grey, and there are numerous reddish-brown chromatophores.

Hab. Off the Rio San Francisco, Brazil (Station 125), probably surface. One mutilated specimen, sex?

Japetella diaphana, n. sp.

The *Body* is gelatinous and semitransparent; it is ovoid in form and considerably longer than broad. The *mantle-opening* is very wide, extending up behind the eyes on either side. The *siphon* extends two thirds of the distance to the umbrella-margin, and is truncated at the extremity. There is a *median septum* in the branchial cavity.

The *Head* is nearly as broad as the body, and the *eyes* are large and prominent; they consist of a larger darkly pigmented spheroid, from which protrudes the smaller opaque white spherical lens.

The *Arms* are unequal; the longest (the third pair) are almost as long as the body and are nearly twice as long as the fourth, which are the shortest, the order of length being 3, 2, 1, 4; they taper rapidly to fine points. The *umbrella* is very small, extending about one fourth up the dorsal and ventral arms, a little further up the dorso-lateral and lateral arms, and being least developed in the space between the ventral and ventro-lateral arms. The *suckers* have assumed, owing to shrinking, a quadrangular or triangular form; they are prominent and marked by two constrictions, one at the base, separating them from the arm, the other rather more than halfway up. There is no trace of any *hectocotylus*.

The *Surface* appears to have been smooth originally, but the epithelium has been to a great extent stripped off.

The *Colour* is a very pale yellowish grey, marked with numerous longitudinally disposed oblong chromatophores.

Hab. North of Papua (Station 220), surface. One specimen, sex?

CIRROTEUTHIS, Eschricht.

Cirroteuthis magna, n. sp.

The *Body* is oblong, about twice as long as broad, and rather broader than deep. The *mantle-opening* is circular, but little larger than the base of the siphon, and its margins are continuous with two ridges on the sides of the latter. The *siphon* is conical and slightly swollen at the tip; it is not connected to the head by ligaments. The *fins* are obovate in form, about four times as long as broad, and thickened along the posterior margin. The *dorsal cartilage* is saddle-shaped and elongated from side to side, not antero-posteriorly.

The *Head* is directly continuous with, and somewhat narrower than, the body; the *eyes* are spheroidal, the lens spherical, and the palpebral opening circular.

The *Arms* are subequal, three and a half times as long as the body; they are slender and more resemble thickenings of the web than independent arms; they are thickest about two thirds the distance along them, and terminate in a delicate slender tip, which projects beyond the web. The *umbrella* is a thin delicate membrane, very largely developed, and when fully expanded its diameter was probably nearly three times as large as its depth. It extends from the tip of the ventral arm on either side backwards and becomes gradually narrower, so that it only extends along the proximal two thirds of the next arm, beneath which it passes, to be attached in a crescentic line to the outer surface of the web, which similarly passes backwards from the tip of this arm; this arrangement is usually described by saying that the arm does not lie in the umbrella for the proximal two thirds of its length, but is joined to it by a vertical web; but this does not so correctly represent the arrangement. The umbrella stretches across from tip to tip of the two dorsal arms, and between the proximal two thirds of the two ventral arms. The *suckers* commence about 1 centim. from the oral margin, and the first four lie pretty close together within a space of less than 2 centim., after which they gradually become further apart, an interval of 2-3 centim. intervening between each two; about two thirds along the arm they stand closer together and are very large, but after this they again become smaller and stand in close contiguity with each other. The proximal suckers are small, prominent, and rather soft, and seem to contract by folding the lateral margins over towards

each other, so as to present the appearance of a half-closed eyelid; but the largest suckers are firm and muscular, and consist of a globular basal portion imbedded in the arm and a short cylindrical projecting portion. The *cirri* commence between the fourth and fifth suckers as very minute prominences which gradually increase in length until halfway along the arm they attain a maximum length of 8 centim., after which they decrease rapidly, and cease opposite the attachment of the web to the ventral aspect of the arm.

The *Surface* of the body has been entirely denuded of epidermis, so that it is impossible to ascertain its nature; the web is perfectly smooth.

The *Colour*, so far as preserved, is a dull madder.

Hab. Between Prince Edward Island and the Crozets; 1375 fathoms (Station 146). One specimen, sex?

Cirroteuthis meangensis, n. sp.

The *Body* is much distorted, but appears to have been subglobular in form. The *mantle-opening* is very small, and fits closely around the base of the *siphon*, which is small and bluntly conical, with a still smaller pimple-like extremity; on either side there extends from the dorso-lateral base a curved fold of membrane, which loses itself in the mantle. The *fins* are about equal in length to the breadth of the body, narrow and pointed at the extremity, and thickened towards the posterior margin. The *dorsal cartilage* is elongated transversely.

The *Head* is exceedingly short, and the *eyes* large and spheroidal.

The *Arms* are subequal and about three times as long as the body in the present shrunken condition of the specimen; they taper rather rapidly to slender points. The *umbrella* extends on the dorsal side of each arm to within 1 centim. of its extremity, whilst on the ventral side it reaches only four fifths along it; the arms lie in the umbrella and are not united to it by any intermediate vertical web. The *suckers* are about sixty to seventy in number, small and subequal; they are at equal intervals for the greater part of the arm, but closer near the extremity. The *cirri* are short, stout, and conical, the largest 2 millim. in length; on the ventral arms they commence between the fourth and fifth suckers and extend to the fiftieth sucker, beyond which there are twenty-one, which gradually decrease; on the dorsal arms the *cirri* commence between the sixth and seventh suckers and continue to the fifty-fifth, beyond which there are nine.

The *Surface* is smooth.

The *Colour* of the body is creamy white, of the arms and umbrella deep madder-brown. The suckers and cirri are paler.

Hab. Off the Meangis Islands, near the Philippines, 500 fathoms (Station 214). One specimen, sex?

Cirroteuthis pacifica, n. sp.

The *Body* is almost entirely absent. The *fin* is obovate in form and thickened along the posterior margin, thin and membranous at the extremity and along the anterior margin. The proximal end of its cartilage is exposed and presents a long grooved articular surface. One *branchia* is visible and presents the appearance of a spheroidal nodule with meridional grooves. The *mantle-opening* is circular, and closely embraces the base of the *siphon*, which is long, thin, and conical.

The *Head* is exceedingly short, and the *eye* appears to occupy all the available space between the fin and the arms.

The *Arms* are subequal, thick, rounded, and soft, and taper rapidly towards the extremities. The *umbrella* is attached directly to the arms, which are somewhat more prominent on its inner than on its outer surface; it is attached to the dorsal aspect of every arm almost to the tip, and to the ventral aspect for somewhat more than half its length, and at its attachment is a firm cartilaginous (?) nodule. The *suckers* are about fifty-two in number and commence close to the oral lip, and the first half-dozen stand near together; halfway up the arms they are further apart, and the largest are situated opposite the attachment of the membrane to the ventral aspect of the arms; they are prominent, but not so hard and firm as those of *C. magna*. There are faint radial markings upon them. The *cirri* commence on the dorsal arms between the seventh and eighth suckers, and continue till the last; on the ventral arms they commence between the sixth and seventh, and here also are continued to the tips of the arms. They begin as small papillæ, gradually increase in length, attaining their maximum about halfway along the arms.

The *Surface* is smooth.

The *Colour* is a deep purplish madder, paler outside the umbrella and on the fin.

Hab. Pacific Ocean, between New Guinea and Australia, surface (Station 181). One mutilated specimen, sex?

AMPHITRETUS, n. gen.

Amphitretus pelagicus, n. sp.

The *Body* is short, rounded, of gelatinous consistency, and

semitransparent. The *mantle* adheres to the sides of the siphon, so that the *mantle-opening*, which is single in all other known Cephalopods, is here divided into two pocket-like openings, which lie one beneath each eye. The *siphon* is very long and narrow, and extends forwards anteriorly to the margin of the mantle, for a distance almost equal to the length of the body, and is a little swollen at the extremity.

The *Head* is undistinguishable from the body except by the possession of the *eyes*, which are situated near together on the dorsal surface; they consist of a larger basal spheroid, through the walls of which pigment is clearly visible, upon which stands a smaller, very prominent spheroid, white, opaque, and of glistening surface.

The *Arms* are equal and rather more than twice as long as the body; they are slender, and taper at first gradually and then more rapidly to comparatively blunt points. The *umbrella* extends more than two thirds up the arms, and is thin, delicate, transparent, and much damaged. The *suckers* are firm, muscular cups embedded in the softer tissue of the arms, as in *Cirroteuthis*; there are about twelve placed at some distance apart on that portion of the arm up which the web extends, and eleven closely set and showing a tendency to biserial arrangement on the free extremities. There are no *cirri* nor is there any trace of the formation of a *hectocotylus*.

The *Surface* appears to have been quite smooth originally; there is no sign of any cirri or warts.

The *Colour* is a dull yellow, apparently due to preservation in picric acid, and the mantle and umbrella are thickly sprinkled with small brown chromatophores.

Hab. Near the Kermadec Islands, South Pacific; on the surface (Station 171). One specimen, sex?

XX.—*Note on the Structure of the Skeleton in the Anomocladina.* By Prof. SOLLAS, D.Sc., F.G.S.

As considerable difficulty appears to exist with regard to the constitution of the skeleton of the Anomocladina it may be useful to publish at once a short account of the results of some observations which appear to remove all doubt. Full particulars, with illustrations, will appear in my paper on *Vetulina*, now in the hands of the Royal Irish Academy.

The Anomocladina, one of the four families of Lithistid